

4th International Congress and Trade Fair
**"WATER: ECOLOGY AND
TECHNOLOGY"**

ECWATECH-2000



ECWATECH

ABSTRACTS

*This edition is published under support
of Russian Federal Ecological Fund*

**Moscow
30 May - 2 June
2000**

THE PROBLEMS OF RE-CULTIVATION OF THE EX-MILITARY BASE IN ZYBROVKA SETTLEMENT (THE GOMEL REGION)

Grechko A.M., Cherepansky M.M.

Central Research Institute of Complex Water Use. Minsk. Belarus

In the result of the USSR disintegration and the withdrawal a range of military services there remained a range of military bases on the territory of Belarus. The above mentioned bases are not used at present, their ecological state is not examined. The peculiarities of the military base in Zybrovka is its location in densely populated region in immediate proximity to Gomel.

There are several inhabitant areas which use mine shafts and individual water intakes for their economic needs and drinking water supply; and the ground water intake station "Korenevsky" providing Gomel central - water supply is located in the distance of 5-6 km North-West of the base.

The ex-military base Zybrovka is a complex of buildings and constructions, which supplied a distant air regiment of the USSR Air Forces. The most dangerous objects from the point of view of environmental pollution are the lubricant and fuel material depots, steering zone and take-off and landing strip.

The results of the research showed that soils of the base are polluted with oil products (up to 10.6 g/kg of the ground) and heavy metals (lead, zinc, cadmium-exceed the Permissible Concentration Limit). Surface water on the lubricant and fuel material depots and in the UT river are polluted exceeding the Permissible Concentration Limit by oil products and heavy metals (lead, zinc, chromium, cadmium). The oil products concentration in the Dnieper water bearing complex of low intensity which is deposited first from the base surface has the capacity of 10-16 m magnitude reaching 630 g/l.

In the result of the research some technical measures of draining aside the surface (storm) and ground water, its disposal as well as of biotechnological soil recultivation from pollution with oil products. The basic constructive solutions of the General Plan, industrial buildings and engineering constructions were prepared. The techno-economical indicators of the base re-cultivation were defined.

RESEARCH OF ROLE OF THE NONPOINT SOURCES OF POLLUTION IN THE CHANGE OF THE GROUNDWATER QUALITY

Grigorieva I.L., Shtriter E.E.

Water Problems Institute of Russia Academy of Sciences, Moscow, Russia

Precipitation, fertilizers, motor transport, technical accumulations and other are one of the importance factors, which effect on the groundwater (GW) quality. These sources carry in environment a number of pollutants with different classes of danger: the anions of strong acids, the heavy metals, biogenesis and others. In terms of permanent anthropogenic load on environment the accumulation of pollutants happens everywhere: in soils, plants, atmosphere, in GW. The GW is the source of pollution for surface water bodies. The watershed of Ivankovo reservoir has been the item of our researches for 25 years.

The pollution of environment of the region happens in result of gaseous discharges of enterprises, the surface flow from territories of populated areas and factories, emissions of cars, of the mineral and organic fertiliser application and the chemical-weed.

The watershed basin of reservoir is 42000 sq. km. It occupies the areas of Tverskoj region mainly, Moscovski, Smolenski and Novgorodski regions - partly. 65% of population live in towns and settlements. 50 towns, settlements, and approximately 12 thousands of villages are numbered here. Over 300 industrial enterprises are here. Towns Tver (460000 population), Dubna (49000 population) and Konakovo (46000 population) are disposed on shores of reservoir directly. Their technogenic impact is the most

significant on the environment. The pollution of environment of the region happens in result of gaseous discharges of enterprises, the surface flow from territories of populated areas and factories, emissions of cars, of the mineral and organic fertiliser application and the chemical-weed. Summary quantity of emissions in atmosphere from thermal-power plants (dioxide nitrogen, sulphureous anhydride, hard substances, oxide carbon) is 13517,2 tons in 1995 in Tver region. Arable lands occupy near 30% of watershed.

In order to assess the role of nonpoint sources in pollution of GW, in particular, flue emissions enterprises and influence of cars were sampled approximately 100 wells and bores. The distribution maps of the sulphate-ion in GW were drawn for the water protection zone (WPZ) for the end of the 70's and for the end of the 90's. It is revealed, that during last 19 years considerable pollution of GW by sulphates took place. Concentrations of sulphates did not exceed 50 mg/l mainly in the end of the 70's. At present concentrations of sulphates 100-300 mg/l are fixed on greatest part of the WPZ. Increase of concentrations of sulphates in GW of the WPZ links with the growth of the sulphate content in precipitation here, and with increase of motor amount.

Increase of concentrations of sulphates in GW of the WPZ links with the growth of the sulphate content in precipitation here, and with increase of motor amount.

Table 1 presents datum concerning hydrochemical compose of snow and rain water. Mean annual rainfall is 500-600 mm on watershed. Precipitation dissolves the sulphureous and nitrogen compounds, chlorine, oxide of carbon, containing in air. So the sulphuris, nutric and carbonic acids are farming, and pH of precipitation are reducing up to 4,5-5,0, especially in the first portions of precipitation. Acid rains,

leaching in soils and rocks of the aeration zone, washout heavy metals, organic matter, change pH and Eh of the soil solutions. The content of hydrocarbonates, calcium, magnium and other ions in GW are decreasing due to enrichment of precipitation by sulphates.

Most considerable changes of type and compose of GW are observed in the area of support [1].

Table 1. Selective hydrochemical composition of precipitation.

Date	Village	Type	pH	NO ₃	NH ₄	SO ₄	Cl
March 1969	Ploski	snow	6,18			2,0	1,0
July 1989	Ploski	rain	6,5	10,2	1,4	2,2	0,2
July 1994	Ploski	rain	6,6	1,7	0,4	15,0	1,1
April 1995	Ploski	rain	5,3	0,7	1,8	16,0	3,2
June 1995	Ploski	rain	5,75	1,9	1,9	31,0	-
March 1996	Vahrameevo	snow	4,7	1,1	1,1	-	-
August 1999	Konakovo	rain	5,3	2,0	1,9	21,2	5,4

Table 2 presents some results of researchs of GW along motorways. Concentrations of sulphates in domestic wells, disposing along motorways and local roads (in zone to 30

m), exceed by 5-6 times the sulphate concentrations in wells, locating far from motorways or locating at a distance of more than 150-200 m.

Table 2. Content pollutants in GW into zone of affect of motorways (1) and out of (2).

village	NO ₃ mg/l	NH ₄ mg/l	SO ₄ mg/l	Cl mg/l
1.Vahonino	24,3	0,33	72,0	18,4
2. Rjabinki	0,1	0,46	14,0	8,0
1. Vahrameevo	63,8	0,5	60,0	319,0
2.Vahrameevo	19,7	0,7	35,0	99,0
1. Roshdestveno	29,9	0,56	455,0	10,4
2. Okulovo	3,35	0,54	50,0	4,2

The multi-annual monitoring of the GW quality on watershed of Ivankovo reservoir showed that the nonpoint pollution sources have a considerable importance in change of the reservoir water quality.

At present the stable tendency is observed to the increase of the sulphate concentration in GW and precipitation. It testifies, what the acidification of natural water occurs, and GW too.

Our work was executed with support of grant R.F.F.R., the expedition grant № 99-05-79028.

Reference

1. Dzhamalov R. G., V. L. Zlobina, M. V. Mironenko and B. N. Pyzhenko. Effect of Acidification of Atmospheric Precipitation on Chemical Equilibria : Thermodynamic Modeling // J. Water Resources № 5, vol.23, 1996. P. 556-564.

HYDROGEOCHEMICAL ESTIMATION OF WATER QUALITY CONDITION OF THE TERSK-KUMSK ARTESIAN BASIN

Guruev M.A., Gazaliev I.M.

Caspian institute of biological resources DNC RAN, Makhachkala, Russia

Osipova N.F.

Administration "Chechenvodresursy" MPR RF, Grozny, Russia

Sepikhanova E.N.

West-Caspian BWU, Makhachkala, Russia

Since 1994 the river Terek has become the most negatively affected and polluted one in Russia. The latest political situation in Chechen Republic has stood on the way

of planning the protection against water pollution and safeguarding its water resources.

During the Chechen war (in 1994-1996, 1999) the lower reaches of the river Terek have become seriously poisoned